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# Environmental Fact Sheet

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## Municipal Solid Waste Generation, Recycling and Disposal in the United States: Facts and Figures for 1998

*This fact sheet, the latest in an ongoing series, describes the national municipal solid waste (MSW) stream based on data collected from 1960 through 1998. The historical perspective is useful for establishing trends in types of MSW generated and in the ways it is managed.*

### Overview

In the United States, we generated approximately 220 million tons of municipal solid waste (MSW) in 1998--an increase of 4 million tons from 1997. The recovery rate for recycling (including composting) continued to grow but at a slower rate. In 1998, the nation's overall recycling rate was 28.2 percent. This is up 0.8 percent from the previous year\* (see tables 1 and 2 and figures 1 and 2).

MSW generation in 1998 remained relatively stable, at 4.46 pounds per person per day. This is a slight increase of 0.03 pounds per person per day compared to 1997. The recycling rate was 1.26 pounds per person per day, and discards after recycling remained unchanged at 3.20 pounds per person per day (table 3).

Source reduction efforts have helped to keep waste generation rates under control. The state of the economy has a direct impact on consumption and waste generation. With the strong economic growth that has occurred throughout the 1990's, waste generation has continued to increase. Despite this, the total per capita waste generation has remained unchanged from 1997 to 1998. On-site yard waste composting, use of mulching mowers, and reductions in the weight of beverage containers have been the main reasons for this success.

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\* Data shown for 1997 has been adjusted to reflect the latest revisions to the data and methodology and, therefore, may differ slightly from the same measure reported previously. For instance, the recycling rate for 1997 was revised from last year's report, to equal 27.4%.

Table 1  
GENERATION, MATERIALS RECOVERY, COMPOSTING,  
AND DISCARDS OF MUNICIPAL SOLID WASTE, 1960-1998

Millions of Tons									
	1960	1970	1980	1990	1994	1995	1996	1997	1998
<b>Generation</b>	88.1	121.1	151.6	205.2	214.2	211.4	209.2	216.4	220.2
Recovery for recycling	5.6	8.0	14.5	29.0	42.2	45.3	46.4	47.3	49.0
Recovery for composting*	Neg.	Neg.	Neg.	4.2	8.5	9.6	10.9	12.1	13.1
<b>Total Materials Recovery</b>	5.6	8.0	14.5	33.2	50.6	54.9	57.3	59.4	62.2
<b>Discards after Recovery</b>	82.5	113.0	137.1	172.0	163.6	156.5	151.9	157.1	158.1

Table 2  
GENERATION, MATERIALS RECOVERY, COMPOSTING,  
AND DISCARDS OF MUNICIPAL SOLID WASTE, 1960-1998

Pounds per Person per Day									
	1960	1970	1980	1990	1994	1995	1996	1997	1998
<b>Generation</b>	2.68	3.25	3.66	4.50	4.50	4.40	4.32	4.43	4.46
Recovery for recycling	0.17	0.22	0.35	0.64	0.89	0.94	0.96	0.97	0.99
Recovery for composting*	Neg.	Neg.	Neg.	0.09	0.18	0.20	0.23	0.25	0.27
<b>Total Materials Recovery</b>	0.17	0.22	0.35	0.73	1.06	1.14	1.18	1.22	1.26
<b>Discards after Recovery</b>	2.51	3.04	3.31	3.77	3.44	3.26	3.14	3.20	3.20
Population (thousands)	179,979	203,984	227,255	249,907	260,682	263,168	256,253	267,645	270,299

Table 3  
GENERATION, MATERIALS RECOVERY, COMPOSTING,  
AND DISCARDS OF MUNICIPAL SOLID WASTE, 1960-1998

Percent of Total Generation									
	1960	1970	1980	1990	1994	1995	1996	1997	1998
<b>Generation</b>	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
Recovery for recycling	6.4%	6.6%	9.6%	14.2%	19.7%	21.5%	22.2%	21.8%	22.2%
Recovery for composting*	Neg.	Neg.	Neg.	2.0%	4.0%	4.5%	5.2%	5.6%	6.0%
<b>Total Materials Recovery</b>	6.4%	6.6%	9.6%	16.2%	23.6%	26.0%	27.4%	27.4%	28.2%
<b>Discards after Recovery</b>	93.6%	93.4%	90.4%	83.8%	76.4%	74.0%	72.6%	72.6%	71.8%

\*Composting of yard trimmings and food wastes. Does not include mixed MSW composting or backyard composting.  
Details may not add to totals due to rounding.

Data for the years prior to 1997 are from the 1998 update. Source: Franklin Associates

Figure 1

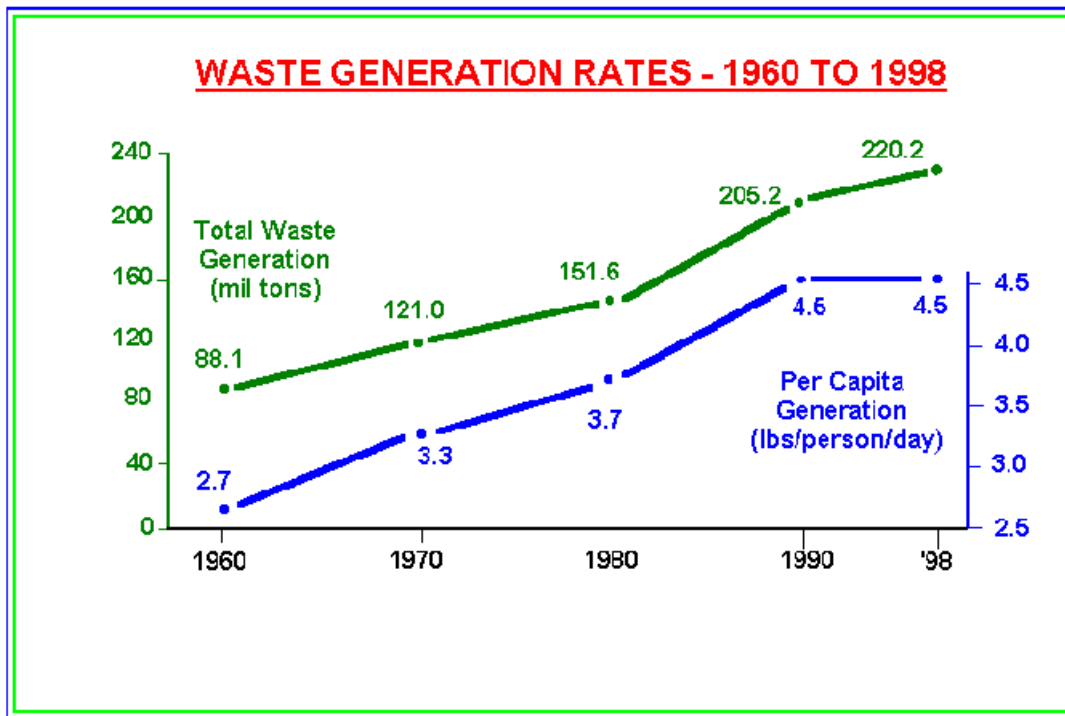
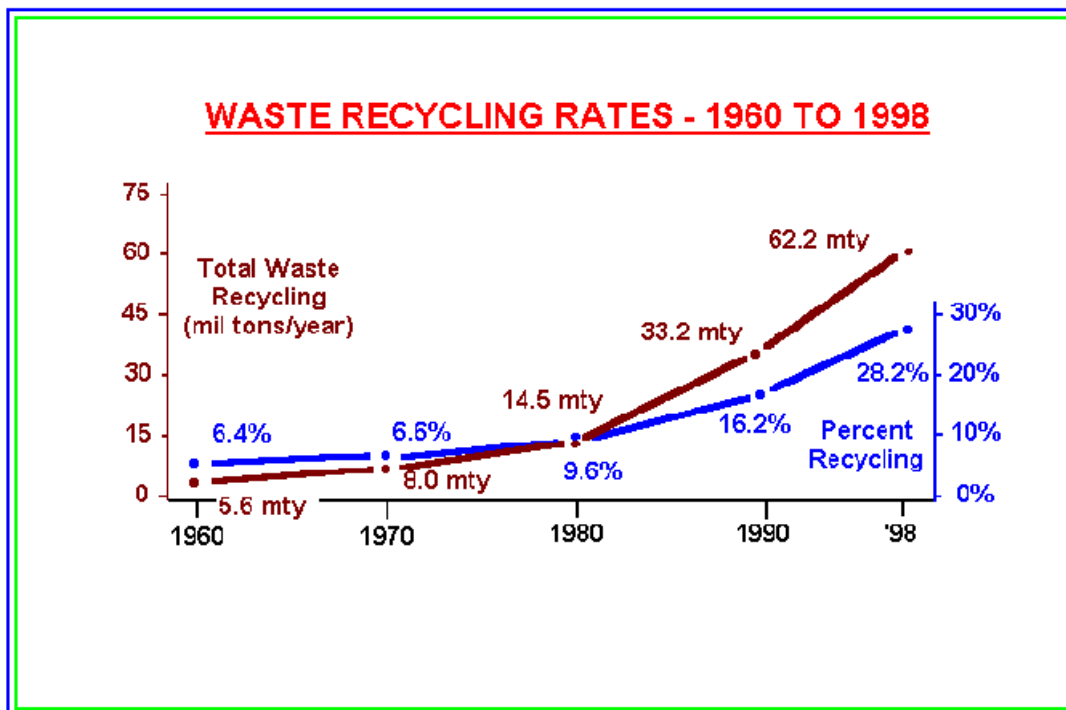


Figure 2



## What is Included in Municipal Solid Waste ?

MSW—otherwise known as trash or garbage—consists of everyday items such as product packaging, grass clippings, furniture, clothing, bottles, food scraps, newspapers, appliances, paint, and batteries. Not included are materials that may also be disposed in landfills, but are not generally considered municipal solid waste, such as construction and demolition debris, municipal wastewater treatment sludges, and non-hazardous industrial wastes.

## Municipal Solid Waste in Perspective

### *Trends Over Time*

Over the last few decades, the generation, recycling, and disposal of MSW have changed substantially (see tables 1, 2, and 3 and figures 1 and 2). MSW generation has increased steadily from 1960, when it was 88 million tons per year. The generation rate per person, just 2.7 pounds per person per day in 1960, grew to 3.7 pounds per person per day in 1980; reached 4.5 pounds per person per day in 1990; and is now 4.46 pounds per person per day.

Waste generation would be even higher, if not for waste prevention practices such as on-site composting and leaving grass clippings on the lawn. In 1998 generation of yard trimmings was estimated at 27.7 million tons, down from 35.0 million tons in 1990 (table 4). Over time, recycling rates have increased from 10 percent in 1980 to 16 percent in 1990, to the current 28.2 percent. Disposal has decreased from 90 percent in 1980 to 72 percent of MSW in 1998.

## Municipal Solid Waste in 1998

EPA has two ways of analyzing the 220 million tons of MSW generated in 1998. The first is by **material** (paper and paperboard, yard trimmings, food scraps, plastics, metals, glass, wood, rubber, leather and textiles, and other), and the second is by several major **product** categories. The product-based categories are containers and packaging; nondurable goods (e.g., newspapers); durable goods (e.g., appliances); yard trimmings; food scraps; and other.

### *Materials in MSW*

In 1998, generation totaled 220 million tons. Figure 3 provides a breakdown, by weight, of the MSW **materials** generated in 1998. Paper and paperboard products made up the largest component of MSW generated (38 percent) and yard trimmings comprised the second largest material component (13 percent). Glass, metals, plastics, wood, and food wastes each constituted between 5 and 10 percent of the total MSW generated. Rubber, leather, and textiles combined made up about 7 percent of MSW, while other miscellaneous wastes made up approximately 2 percent of the MSW generated in 1998.

A portion of each **material category** in MSW was recycled or composted in 1998. The highest rates of recycling were achieved with yard trimmings, metals and paper. About 12.6 million tons of yard trimmings were recovered for composting in 1998. Therefore, 45 percent of the yard trimmings generated were composted, more than a three-fold increase since 1990. About 35 million tons of paper and paperboard were recovered for recycling in 1998. Therefore, about 42 percent of the paper and paperboard generated in 1998 was recovered. Recycling of these organic materials alone diverted over 21 percent of municipal solid waste from landfills and incineration. In addition, about 6.1 million tons of metals were recovered for recycling, or 36 percent. Table 4 lists the recycling rates for 1998 for all of the materials categories.

### *Products in MSW*

Figure 4 shows the breakdown, by weight, of **product categories** generated in 1998. Containers and packaging comprised the largest portion of products generated, at 33 percent (72 million tons) of total MSW generation. Nondurable goods were the second largest fraction, comprising about 27 percent (60 million tons). The third main category of products is durable goods, which comprised 16 percent (34 million tons) of total MSW generation.

Table 5 shows the generation and recovery of the **product** categories in MSW. This table shows that recovery of *containers and packaging* was the highest of the three product categories—40 percent of containers and packaging generated in 1998 were recovered for recycling. About 44 percent of aluminum packaging was recovered (mostly beverage cans), while 57 percent of steel packaging (mostly cans) was recovered. Paper and paperboard packaging recovery was estimated at 55 percent; corrugated containers accounted for most of that figure.

Approximately 29 percent of glass containers were recovered overall, while about 10 percent of wood packaging (mostly pallets removed from service) was recovered for recycling. About 10 percent of plastic containers and packaging was recovered in 1998, mostly soft drink, milk, and water bottles.

Overall recovery of *nondurable goods* was 24 percent in 1998. Within this category, about 15.3 percent of clothing and other textile nondurable products also were recovered for recycling.

Overall, *durable goods* were recovered at a rate of 17 percent in 1998. Nonferrous metals had one of the highest recovery rates, at 67%, due to the high rate of lead recovery from lead-acid batteries. Twenty-eight percent of ferrous metals were recovered from appliances and miscellaneous durable goods. Excluding retreads and tire-derived fuel use, over 23 percent of tires also were recovered for recycling.

### **Residential and Commercial Sources of MSW**

Sources of MSW, as characterized in this report, include both residential and commercial locations. We estimated residential waste (including waste from multi-family dwellings) to be 55

Figure 3

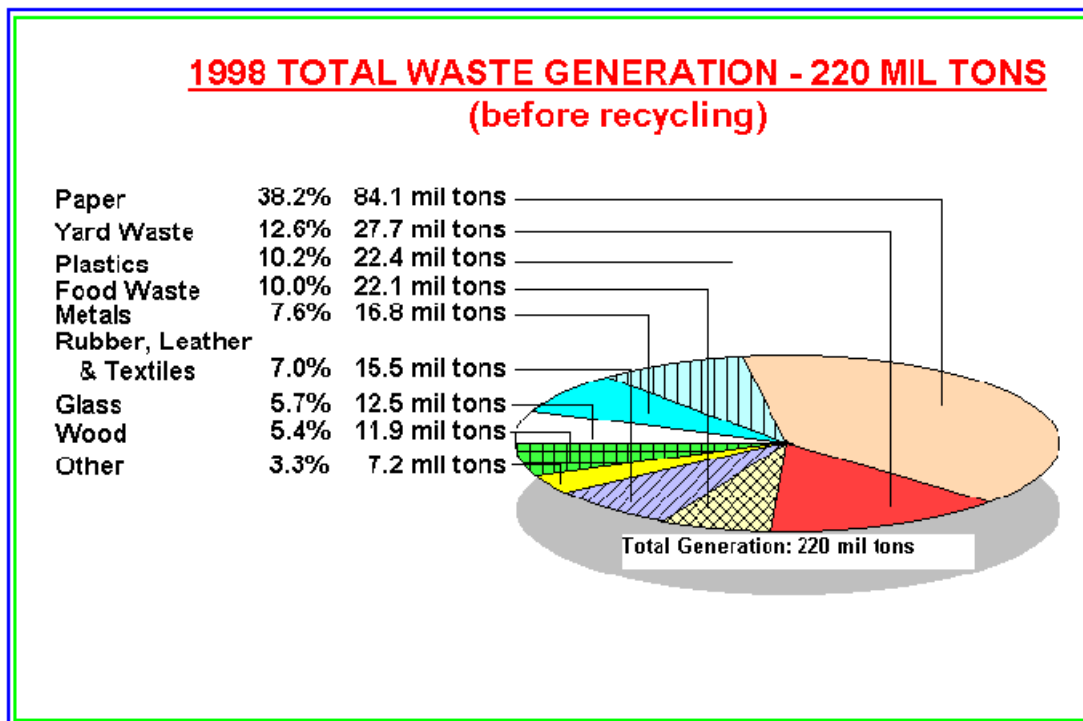
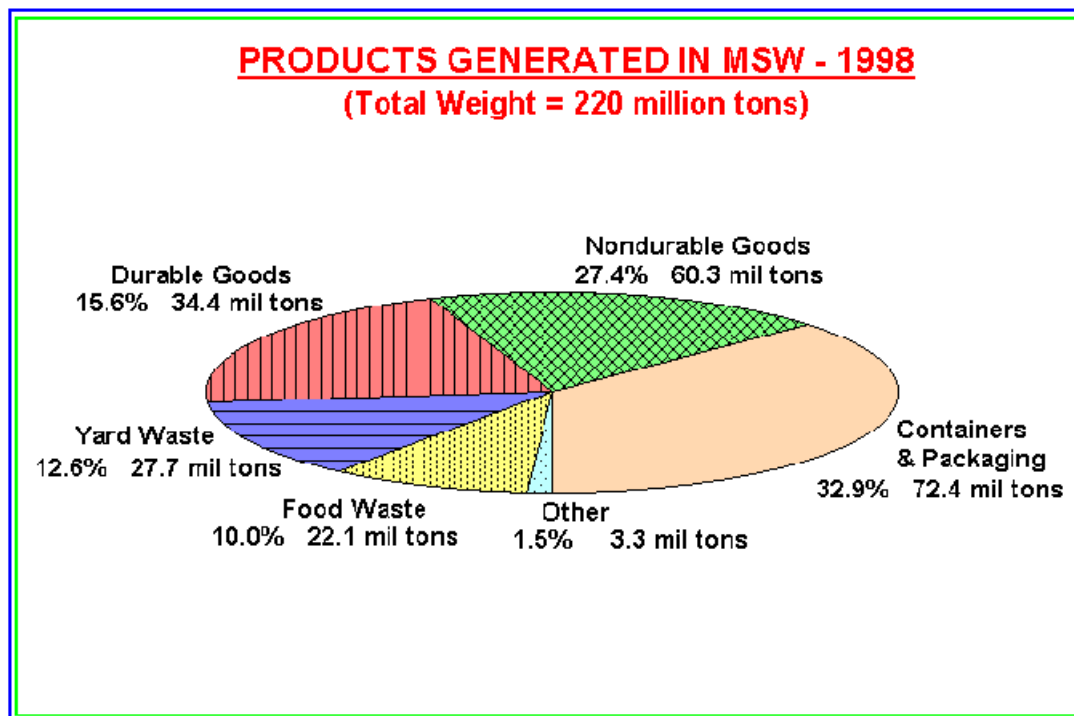


Figure 4



**Table 4**

**GENERATION AND RECOVERY OF MATERIALS IN MSW, 1998**  
**(In millions of tons and percent of generation of each material)**

	<b>Weight Generated</b>	<b>Weight Recovered</b>	<b>Recovery as a Percent of Generation</b>
Paper and paperboard	<b>84.1</b>	<b>35.0</b>	<b>41.6%</b>
Glass	<b>12.5</b>	<b>3.2</b>	<b>25.5%</b>
Metals			
Steel	<b>12.4</b>	<b>4.3</b>	<b>35.1%</b>
Aluminum	<b>3.1</b>	<b>0.9</b>	<b>27.9%</b>
Other nonferrous metals*	<b>1.4</b>	<b>0.9</b>	<b>67.4%</b>
<i>Total metals</i>	<b>16.8</b>	<b>6.1</b>	<b>36.4%</b>
Plastics	<b>22.4</b>	<b>1.2</b>	<b>5.4%</b>
Rubber and leather	<b>6.9</b>	<b>0.9</b>	<b>12.5%</b>
Textiles	<b>8.6</b>	<b>1.1</b>	<b>12.8%</b>
Wood	<b>11.9</b>	<b>0.7</b>	<b>6.0%</b>
Other materials	<b>3.9</b>	<b>0.9</b>	<b>23.1%</b>
<b><i>Total Materials in Products</i></b>	<b>167.1</b>	<b>49.0</b>	<b>29.3%</b>
Other wastes			
Food, other**	<b>22.1</b>	<b>0.6</b>	<b>2.6%</b>
Yard trimmings	<b>27.7</b>	<b>12.6</b>	<b>45.3%</b>
Miscellaneous inorganic wastes	<b>3.3</b>	<b>Neg.</b>	<b>Neg.</b>
<b><i>Total Other Wastes</i></b>	<b>53.2</b>	<b>13.1</b>	<b>24.7%</b>
<b><i>TOTAL MUNICIPAL SOLID WASTE</i></b>	<b>220.2</b>	<b>62.2</b>	<b>28.2%</b>

Includes Wastes from residential, commercial, and institutional sources.

\*Includes lead from lead-acid batteries.

\*\*Includes recovery of paper for composting.

Neg.= Less than 50,000 tons or 0.05 percent.

**Table 5**  
**GENERATION AND RECOVERY OF PRODUCTS IN MSW**  
**BY MATERIAL, 1998**  
(In millions of tons and percent of generation of each product)

	Weight Generated	Weight Recovered	Recovery as a Percent of Generation
<b>Durable goods</b>			
Ferrous metals	9.4	2.7	28.2%
Aluminum	0.9	Neg.	Neg.
Other non-ferrous metals	1.4	0.9	67.4%
<i>Total metals</i>	11.8	3.6	30.6%
Glass	1.4	Neg.	Neg.
Plastics	6.9	0.3	3.8%
Rubber and leather	6.0	0.9	14.3%
Wood	4.6	Neg.	Neg.
Textiles	2.5	0.2	7.9%
Other materials	1.1	0.9	81.8%
<i>Total durable goods</i>	34.4	5.7	16.7%
<b>Nondurable goods</b>			
Paper and paperboard	45.0	13.4	29.7%
Plastics	5.6	Neg.	Neg.
Rubber and leather	0.8	Neg.	Neg.
Textiles	5.9	0.9	15.3%
Other materials	2.8	Neg.	Neg.
<i>Total nondurable goods</i>	60.3	14.3	23.7%
<b>Containers and packaging</b>			
Steel	2.9	1.7	57.1%
Aluminum	2.0	0.9	43.9%
<i>Total metals</i>	4.9	2.5	51.8%
Glass	11.0	3.2	28.9%
Paper and paperboard	39.1	21.6	55.2%
Plastics	9.9	0.9	9.6%
Wood	7.3	0.7	9.8%
Other materials	0.2	Neg.	Neg.
<i>Total containers and packaging</i>	72.4	29.0	40.0%
<b>Other wastes</b>			
Food wastes	22.1	0.6*	2.6%
Yard trimmings	27.7	12.6	45.3%
Miscellaneous inorganic wastes	3.3	Neg.	Neg.
<i>Total other wastes</i>	53.1	13.1	24.7%
<b>TOTAL MUNICIPAL SOLID WASTE</b>	<b>220.2</b>	<b>62.2</b>	<b>28.2%</b>

Includes wastes from residential, commercial, and institutional sources.

\*Includes recovery of paper for composting.

Neg. = less than 50,000 tons or 0.05 percent.



to 65 percent of total MSW generation. Commercial waste (including waste from schools, some industrial sites where packaging is generated, and businesses) constitutes between 35 and 45 percent of MSW. Local and regional factors, such as climate and level of commercial activity, contribute to these variations.

## **Management of MSW**

EPA's integrated waste management hierarchy includes the following three components, listed in order of preference:

- o Source reduction (or waste prevention) including reuse of products and on-site, or backyard composting of yard trimmings
- o Recycling, including off-site, or community composting
- o Disposal, including waste combustion (preferably with energy recovery) and landfilling.

Although we encourage using strategies that emphasize the top of the hierarchy whenever possible, all three components remain important within an integrated waste management system.

### *Source Reduction*

Source reduction, or waste prevention, includes the design, manufacture, purchase, or use of materials, such as products and packaging, to reduce their amount or toxicity before they enter the MSW management system. Some examples of source reduction activities are:

- o Designing products or packaging to reduce the quantity or the toxicity of the materials used, or to make them easy to reuse.
- o Reusing existing products or packaging, for example, refillable bottles, reusable pallets, and reconditioned barrels and drums.
- o Lengthening the lives of products such as tires to postpone disposal.
- o Using packaging that reduces the amount of damage or spoilage to the product.
- o Managing nonproduct organic wastes (e.g., food scraps and yard trimmings) through on-site composting or other alternatives to disposal (e.g., leaving grass clippings on the lawn).

### *Recycling*

- o Recycling (including community composting) recovered 28 percent (62 million tons) of MSW in 1998.

- o There were over 9,300 curbside recycling programs in the United States in 1998. This is up from about 8,900 curbside recycling programs in 1997.
- o About 3,800 yard trimmings composting programs were reported in 1998. This compared to about 3,500 yard trimmings composting programs reported in 1997.

## *Disposal*

At present, about 55% of the MSW generated, is disposed at landfills. Figure 5 shows that the number of municipal solid waste landfills decreased substantially over the last ten years from about 8,000 in 1988 to 2,314 in 1998--while the average landfill size increased. At the national level, capacity does not appear to be a problem, although regional dislocations sometimes occur.

- o As recovery rates have increased, and combustion remained relatively constant, the percentage of MSW discarded to landfills decreased over time from 1980 to 1996, and has remained steady at approximately 55% since 1996.
- o The net per capita discard rate (after recovery for recycling) remained stable at 3.2 pounds per person per day from 1997 to 1998 (Table 2).

Figure 6 shows MSW recovered for recycling (including composting) and disposed of by combustion and landfilling in 1998. In 1998, 62 million tons of MSW was recycled. Since the amount of waste combusted from 1997 to 1998 has remained unchanged, 37 million tons was combusted (17%), and 121 million tons (55%) was landfilled. (Relatively small amounts of this total undoubtedly were littered or illegally dumped rather than landfilled.)

## **Goals for the Nation**

It is EPA's goal for the nation to recycle at least 35% of MSW by the year 2005, while reducing the generation of solid waste to 4.3 pounds per person per day. Because economic growth results in more products and materials being generated, there will be an increased need to further develop our recycling and composting infrastructure, buy more recycled products, and invest in source reduction activities such as reuse of materials and products, and lightweighting of products and packaging in order to meet these goals.

## **For further information**

The tables used in producing this report are available on the internet at [www.epa.gov/osw](http://www.epa.gov/osw), by looking under "publications" for this fact sheet, listed there alphabetically by title. Additional information on source reduction is available in *National Source Reduction Characterization Report for Municipal Solid Waste in the United States*, EPA530-R-99-034, November 1999.

Figure 5

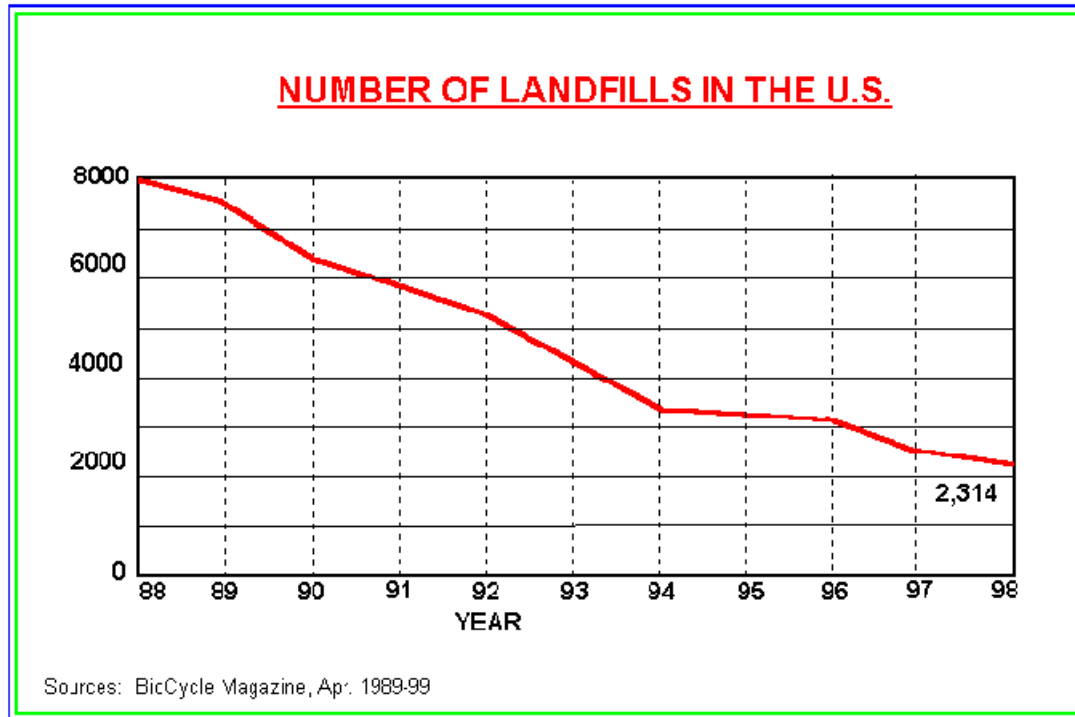


Figure 6

